

CLAIMS

What is claimed is:

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1. A metabolite produced by *Streptomyces* sp. strain NRRL No. B-30145 and mutants thereof having all the identifying characteristics of NRRL No. B-30145 and that exhibits activity against plant pathogenic fungi.

2. The metabolite of claim 1, wherein the metabolite has a molecular weight
10 $[M+H^+]$ between about 925 to about 865.

3. The metabolite of claim 2, wherein the molecular weight is selected from the group consisting of 866.5, 882.5, 898.4, 892.5, 908.5 and 924.5.

4. The metabolite of claim 1, wherein the metabolite is heat and base stable, is acid labile and has a molecular weight $[M+H^+]$ between about 925 to about 865.

5. The metabolite of claim 4, wherein the molecular weight is selected from
15 the group consisting of 866.5, 882.5, 898.4, 892.5, 908.5 and 924.5.

6. The metabolite of claim 1, wherein the metabolite has a chromatogram at 220 nm shown in Figure 3.

7. The metabolite of claim 1, wherein the metabolite exhibits UV absorption
20 between about 215 nm and 220 nm.

8. The metabolite of claim 1, wherein the metabolite has a 1H Nuclear Magnetic Resonance spectra shown in Figure 4.

9. The metabolite of claim 1, wherein the metabolite has a ^{13}C Nuclear Magnetic Resonance spectra shown in Figure 5.

10. The metabolite of claim 1, wherein the metabolite comprises one or more
25 molecules selected from the group consisting of propargyl alcohol segments $[C=C-CH(OH)]$, oxygenated methine carbons $(X-CH-Y)$ or a sugar moiety.

11. The metabolite of claim 10, wherein the metabolite comprises at least two propargyl alcohol segments $[C=C-CH(OH)]$.

12. A composition comprising the metabolite of claim 1 and a carrier.

13. A composition comprising more than one metabolite of claim 1 and a
30 carrier.

14. The composition of claim 12, further comprising at least one chemical or biological pesticide.

15. The composition of claim 13, further comprising at least one chemical or biological pesticide.

5 16. The composition of claim 12, wherein the composition is formulated from the group consisting of a wettable powder, a granule, an aqueous suspension, and emulsifiable concentrate and a microencapsulated formulation.

10 17. The composition of claim 13, wherein the composition is formulated from the group consisting of a wettable powder, a granule, an aqueous suspension, and emulsifiable concentrate and a microencapsulated formulation.

18. A method for protecting or treating plants, fruit, and roots from fungal infections comprising applying an effective amount of the metabolite of claim 1 to the plant, fruit or root.

15 19. The method of claim 18, wherein the infections are caused by a fungus selected from the group consisting of *Alternaria solani*, *Botrytis cinerea*, *Rhizoctonia sp.*, *Sclerotinia sp.*, and *Phytophthora sp.*

20 20. The method of claim 18, wherein more than one metabolite of *Streptomyces sp.* NRRL No. B-30145 strain that exhibits activity against plant pathogenic fungi is applied.

21. The method of claim 18, wherein the metabolite has a molecular weight $[M+H^+]$ between about 925 to about 865.

22. The method of claim 21, the molecular weight of the metabolite is selected from the group consisting of 866.5, 882.5, 898.4, 892.5, 908.5 and 924.5.

25 23. The method of claim 18, wherein the metabolite is heat and base stable, is acid labile and has a molecular weight $[M+H^+]$ between about 925 to about 865.

24. The method of claim 23, wherein the molecular weight is selected from the group consisting of 866.5, 882.5, 898.4, 892.5, 908.5 and 924.5.

25. The method of claim 18, wherein the metabolite has a chromatogram at 220 nm shown in Figure 3.

30 26. The method of claim 18, wherein the metabolite exhibits UV absorption between about 215 nm and 220 nm.

27. The method of claim 18, wherein the metabolite has a ^1H Nuclear Magnetic Resonance spectra shown in Figure 4.

28. The metabolite of claim 18, wherein the metabolite has a ^{13}C Nuclear Magnetic Resonance spectra shown in Figure 5.

5 29. The method of claim 18, wherein the metabolite is applied as a formulation selected from the group consisting of wettable powders, granules, aqueous suspensions, emulsifiable concentrates or microencapsulations.

30. The method of claim 29, further comprising applying an effective amount of at least one chemical or biological pesticide.

10 31. The method of claim 29, wherein the formulation comprises more than one metabolite.

32. An antifungal composition comprising a metabolite produced by *Streptomyces* and isolated according to a method comprising:

(a) loading a whole broth culture of *Streptomyces sp. strain* NRRL No. B-
15 30145 or mutants thereof having all the identifying characteristics of NRRL No. B-30145 onto a non-ionic absorbent polymeric resin;

(b) eluting the metabolite with an alcohol;

(c) screening the eluent of step (b) with a bioassay for fractions of the eluent exhibiting antifungal activity;

20 (d) loading the fractions of the eluent exhibiting antifungal activity of step (c) on a HPLC column; and

(e) eluting the metabolite with an organic solvent.

33. The composition of claim 32, wherein the eluent of step (b) is methanol or a gradient of aqueous methanol.

25 34. The composition of claim 32, wherein the bioassay of step (c) is selected from the group consisting of the agar diffusion assay or slide germination assay.

35. The composition of claim 32, wherein the organic solvent of step(e) is an acetonitrile –water gradient.

30 36. A method for protecting or treating plants, fruit, and roots from fungal infections comprising applying an effective amount of the composition of claim 32 to the plant, fruit or root.

37. The method of claim 32, wherein the infections are caused by a fungus selected from the group consisting of *Alternaria solani*, *Botrytis cinerea*, *Rhizoctonia sp.*, *Sclerotinia sp.*, and *Phytophthora sp.*

38. The method of claim 32, wherein the *Streptomyces sp.* strain NRRL
5 No. B-30145 is applied as a formulation selected from the group consisting of wettable powders, granules, aqueous suspensions, emulsifiable concentrates or microencapsulations.

39. The method of claim 32, further comprising applying an effective amount of at least one chemical or biological pesticide.

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